REMARKS

This amendment is responsive to the Office Action mailed November 21, 2007, and is being filed in conjunction with a Request for Continued Examination (RCE). Reconsideration and allowance of claims 1 and 3-14 are requested.

The Status of the Claims

Claims 1, 2, and 4-7 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Suzuki, U.S. Publ. Appl. No. 2003/0123603 A1 (hereinafter "Suzuki").

Claims 1, 6, 10, and 11 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Banks et al., U.S. Pat. No. 6,603,494 (hereinafter "Banks").

Claims 3, 8, 9, 12, and 13 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Suzuki in view of Banks.

Claim 7 stands rejected under 35 U.S.C. § 112, 2nd paragraph for alleged indefiniteness.

The references of record

Suzuki relates to an image planning system for computed tomography (CT), which assists the operator in determining the reconstruction method based on the scanning conditions. *See, e.g.* end of ¶[0005]. Additionally, Suzuki discloses a controller that controls the display and selection of the reconstruction method according to scan parameters or operator selection. *See, e.g.* ¶¶[0008]-[0018].

The image planning system of Suzuki operates prior to execution of the imaging data acquisition, and determines, for example, the correct relationship between number of CT imaging slices, helical pitch, and sufficient sampling to avoid artifacts (*e.g.*, ¶[0007]), and grades and recommends a reconstruction method based on the CT imaging data acquisition parameters (*e.g.*, as shown in Fig. 8B). As noted in the Office Action at page 2 of the Office Action, the image planning system is operative during execution insofar as the host controller (116) controls the CT scanner during execution of the operations generated by the planning system. However, the "priority instructions" (Suzuki ¶¶[0067]-[0068]) cited in the Office Action as control operations appear to be employed during the planning stage prior to execution, as it is explained in Suzuki that the user sets an order of priority for factors such as x-ray

dose, scan time, scan-to-reconstruction time, image quality, contrast, and x-ray tube waiting time, and the planning creation system (120) sets up the scan type and reconstruction method in accordance with these priorities. ¶¶[0082]-[0084]. The control system of Suzuki also provides confirmation requests and alerts during execution to appraise the operator of changing conditions. ¶[0104].

The image planning performed by Suzuki relates to optimizing parameters for operational items. For example, the scan type and reconstruction method are automatically selected based on received information for the operational item. ¶[0082]. Suzuki thus addresses the concern that in CT the "best" reconstruction method is strongly dependent upon the scan type and conditions. ¶[0005].

Suzuki does not disclose or fairly suggest an automated ordering of the operational items based on parameter settings of the operational items. To the contrary, Suzuki teaches that the operator sets up the order of operations, that is, sets up the order of operations in the scanning schedule table (Suzuki Fig. 4). "In this scanning schedule table, a plurality of scanning operations are perpendicularly arranged according to the order of a series. The operator makes and arranges using each function, such as a new addition, a copy, and an elimination." ¶[0069]. The automated components of Suzuki's image planning system optimize the parameter settings for scanning operation, that is, optimize the values for the columns of the scanning schedule table. But, there is no disclosure or fair suggestion in Suzuki of automated optimizing of the ordering of the operations based on parameter settings.

Banks relates to a universal user interface that is usable for different imaging modalities, such as MR, CT, and so forth. As shown in Fig. 2, Banks employs a data table (200) that sorts exams based on radiologist [first column (204)], exam type listing all exams for each radiologist [second column (206)], the required images for each exam type [third column (208)], an index value indexing a position image retrievable from a position image table (202) to show the desired patient position for acquisition of each required image [fourth column (210)], and the parameters for acquiring each required image [fifth column (214)].

Again, Banks does not disclose or fairly suggest an automated ordering of the operational items based on parameter settings of the operational items. Taking each required image to be an operational item, it is not disclosed that the order in which the

required images are listed in third column (208) is the order in which they are to be executed, much less that this order was generated automatically based on the parameter settings given in the fifth column (214). Indeed, insofar as the required images for each exam type are associated with a radiologist, it would seem most reasonable to assume that any ordering related to execution is selected by the associated radiologist rather than by an automated system.

The Claims Present Patentable Subject Matter and Should be Allowed

Claim 1 has been amended to incorporate the subject matter of canceled claim 2, and calls for the scheduler module autonomously ordering the operational items based on respective parameter settings of the operational items. The clarifying recitation of autonomous ordering is supported in the original specification at least at page 3 lines 25-27. The scheduler module produces an autonomously ordered selection of operational items. In some embodiments, the scheduler module further supports an editing mode in which an operator can edit the autonomously ordered selection of operational items, as called out in new dependent **claim 14** which is supported in the original specification at least at page 3 lines 27-29.

As explained in the present application, the autonomous ordering of the selection of operational items based on respective parameter settings may, for example, group together operations that share the same geometry planning (page 4 lines 28-33) so that the geometry planning need only be carried out once, or may group together operations that are to be performed at the same patient support station (page 5 line 31-page 6 line 4) to minimize the displacements of the patient support.

By providing a scheduler module that performs autonomous ordering, the human operator is not required to compare and contrast similarities and differences amongst the (possibly numerous) items of the selection of operational items and to optimize the order of execution of the operational items based on the perceived similarities and differences. The autonomously ordered selection of operational items is executed in order as the scheduler releases the operational items to the execution list according to the ordered selection, as further recited in claim 1.

The planning automatically performed by the system of **Suzuki** is on a per-operational item basis. Suzuki does not disclose or fairly suggest a scheduler

module autonomously ordering the operational items based on respective parameter settings of the operational items. Rather, Suzuki's system optimizes the parameter settings of each operational item, such as the scan mode, pitch, scan time, scan speed, image slice width, tube settings (e.g., kV and mA), and reconstruction method for each operational item. These parameter settings are generally interrelated, and the operator can set priorities for the planning using the priority instruction buttons B1...B5 shown in Suzuki Fig. 4 as described at ¶¶[0082]-[0084].

In rejecting claim 2 as allegedly anticipated by Suzuki, the Office Action cites Suzuki ¶[0066] and ¶[0082]. The former paragraph discloses automated selection of the reconstruction method parameter setting for an operational item based on other information relating to that operational item. No autonomous ordering of a selection of operational items is suggested. The latter paragraph, as already discussed, relates to using operator-selected priority instructions to prioritize the automated selection of parameters settings such as x-ray dose, scan time, scan-to-reconstruction time, image quality, contrast, and x-ray tube waiting time, for an operational item. Again, no autonomous ordering of a selection of operational items is suggested.

Banks cannot remedy these deficiencies of Suzuki. The Office Action does not allege that Banks anticipates claim 2. In articulating the rejection of claim 1 the Office Action identifies element (208) of Banks Fig. 2 as an ordered selection of operational items. However, Banks identifies the third column (208) of the data table (200) as a listing of the required images for each exam type. There is no suggestion that this listing is in any particular ordering, whether generated autonomously or otherwise. (Banks col. 10 lines 18-26. Moreover, each exam type in the second column (206) of the data table (200) is associated with a particular doctor, which suggests that any execution ordering of the required images listed in the third column (208) was selected by that doctor, rather than by autonomous operation of a scheduler module.

For at least the foregoing reasons, it is respectfully submitted that claims 1, 4, 5, 7, 10, and 14 distinguish patentably over the references of record. Accordingly, Applicants respectfully request allowance of claims 1, 4, 5, 7, 10, and 14.

Claim 6 has been amended to recite a user interface including a scheduler module which generates an ordered selection of operational items autonomously ordered by the scheduler module based on parameter settings of the operational items, and further recites that the scheduler module is configured to issue instructions to the user prompted by the operational items during the execution of the operational items.

In some embodiments, the scheduler module is arranged to issue an instruction to the user prompted by execution of an operational item calling for applying a surface RF coil, as recited in **claim 12**. In some embodiments, the scheduler module is arranged to issue an instruction to the user prompted by execution of an operational item calling for infusion of contrast agent, as recited in **claim 13**.

The scheduler module advantageously streamlines the workflow by generating an ordered selection of operational items autonomously ordered by the scheduler module based on parameter settings of the operational items, for example to group together operational items that employ a surface RF coil or that entail infusion of a contrast agent. The scheduler module also issues instructions to the user prompted by the operational items during the execution of the operational items. The number of such issued instructions can in some circumstances be reduced the autonomous ordering of the operational items by the scheduler module. For example, if the autonomous ordering groups together all operational items having as a parameter setting the use of a surface RF coil, the scheduler module can issue a single instruction to install the surface RF coil just before the first operational item of that grouping of operational items.

For at least the foregoing reasons, it is respectfully submitted that claims 6 and 11-13 distinguish patentably over the references of record. Accordingly, Applicants respectfully request allowance of claims 6 and 11-13.

Claim 9 relates to a magnetic resonance imaging system, and has been amended to clarify that the various imaging positions are more particularly imaging stations. This amendment is supported in the original specification at least at page 5 lines 31-33. A "station" denotes a stationary position, as illustrated in the present application by the six illustrative stations of Fig. 4 corresponding to the patient's head, shoulders, abdomen, upper legs, lower legs, and feet. *See* present application at page 9

lines 10-12. Claim 9 relates to certain magnetic resonance embodiments disclosed in the present application as follows:

> [T]he patient support is a patient table that is moveable to respective imaging positions, also called 'stations', where different parts of the patient's anatomy can be imaged. According to a further aspect of the invention at individual stations several image acquisition sequences are carried out. Notably, all image acquisition sequences that the operator has specified are carried out at a current station and the patient is moved to the next station when all image acquisition sequences for the current station have been completed. Hence, the displacements of the patient support with the patient remains limited to a small number.
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> Present application at page 5 line 31-page 6 line 4.

Claim 9 recites a control system set up to displace the patient support among various imaging stations and conduct several different magnetic resonance imaging sequences at individual imaging stations such that the different magnetic resonance imaging sequences at each individual imaging station share the same geometry, the control system grouping all image acquisition sequences to be performed at each individual station together and performing all image acquisition sequences to be performed at each individual station together before the patient support is moved to a next station of the various imaging stations.

The Office Action rejects claim 9 as allegedly obvious in view of the proposed combination of Suzuki and Banks. Suzuki ¶[0067] is cited as disclosing controlling the gantry and bed to perform the schedule one by one. However, there is no suggestion that any schedule item is performed at a station – to the contrary, Suzuki relates to computed tomography which, at least in the helical approach, employs continuous bed motion in conjunction with x-ray tube revolution to produce a helical spiraling of the x-ray tube around the subject. There is no identifiable individual imaging station in helical acquisition.

Moreover, the Office Action acknowledges at page 7 that Suzuki is unrelated to magnetic resonance imaging systems, and cites Banks in an attempt to remedy this deficiency. This combination relies upon Suzuki disclosing conducting different magnetic resonance imaging sequences at an individual imaging station, which however is not suggested by Suzuki.

Still further, the Office Action cites Banks Fig. 2 as graphically disclosing acquiring different magnetic resonance imaging sequences such that the different magnetic resonance imaging sequences at individual imaging position share the same geometry. This is not what Fig. 2 shows. Rather, Fig. 2 shows a position image table (202) which stores graphical representations, or icons, of different patient positions. The data table (200) includes position index values in the fourth column (210) so that for each required image the appropriate patient position icon can be retrieved from the position image table (202) and displayed. There is no suggestion that the ordering of acquisition of the required images be selected to group together common geometries. As an additional point, it should be noted that the different patient positions of Fig. 2 appear to relate to the patient, and not to the patient support. The horizontal line representing the patient support in these icons appears to be in the same position in every illustrated icon. In contrast, claim 9 recites a control system set up to displace the patient <u>support</u> among various imaging stations.

More generally, neither Suzuki, nor Banks, nor their combination, disclose or fairly suggest a control system grouping all image acquisition sequences to be performed at each individual station together and performing all image acquisition sequences to be performed at each individual station together before the patient support is moved to a next station of the various imaging stations. Suzuki at most discloses imaging at different positions of the patient bed, and more reasonably is read to disclose imaging at different displacement intervals of continuous motion of the patient bed. There is no suggestion of grouping acquisitions and performing all acquisitions at each individual station together before the patient support is moved to a next station. Banks discloses that different images may be acquired with the patient in different positions, but again does not disclose or fairly suggest performing all acquisitions at each individual station together before the patient support is moved to a next station.

For at least the foregoing reasons, it is respectfully submitted that claims 3, 8, and 9 distinguish patentably over the references of record. Accordingly, Applicants respectfully request allowance of claims 3, 8, and 9.

CONCLUSION

For the reasons set forth above, it is respectfully submitted that claims 1 and 3-14 distinguish patentably over the references of record and meet all statutory requirements. An early allowance of all claims is requested.

In the event that personal contact is deemed advantageous to the disposition of this case, the Examiner is requested to telephone the undersigned at (216) 861-5582.

Respectfully submitted,

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